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**TAXONOMIC MATERIAL
AND REFERENCE LISTINGS
FOR INSECT IDENTIFIERS**

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COCCOIDEA

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C O N T E N T S

1. Genera and Species of Coccidae in the United States
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GENERA AND SPECIES OF COCCIDAE
IN THE UNITED STATES *

This list contains 23 genera and 86 nominate species. Two undescribed species were included in the list. Also listed are three synonyms that were considered good species until recently.

<u>Genus</u>	<u>No. of Species</u>	<u>Genus</u>	<u>No. of Species</u>
<u>Ceroplastes</u>	11	<u>Neolecanium</u>	2
<u>Ceroplastodes</u>	3	<u>Parasaissetia</u>	1
<u>Coccus</u>	8	<u>Philephedra</u>	1
<u>Eriopeltis</u>	2	<u>Physokermes</u>	6
<u>Eucalymnatus</u>	1	<u>Protopulvinaria</u>	1
<u>Exaeretopus</u>	1	<u>Pseudokermes</u>	1
<u>"Filippia"</u>	1	<u>Pseudophilippia</u>	1
<u>Inglisia</u>	2	<u>Pulvinaria</u>	16, 1 nsp
<u>Kilifia</u>	1, 1 nsp	<u>Saissetia</u>	4
<u>Lecanium</u>	10	<u>Sphaerolecanium</u>	1
<u>Lecanopsis</u>	1	<u>Toumeyella</u>	9
<u>Mesolecanium</u>	1		

CEROPLASTES

Distribution by States

<u>C. brachyurus</u> Cockerell	AZ, AL
<u>C. ceriferus</u> (Fabricius)	AL, AR, DC, FL, GA, IL, LA, MD, MS, NC, NJ, NY, OK, SC, TX, VA
<u>C. cirripediformis</u> Comstock	AL, AZ, CA, DC, FL, GA, LA, MD, MO, MS, NC, OH, PA, SC, TX
<u>C. cistudiformis</u> Townsend and Cockerell	CA (southern)
<u>C. dugesii</u> Lichtenstein	FL
<u>C. floridensis</u> Comstock	DC, FL, GA, LA, MD, MO, MS, NC, NM, NY, SC, TX, VA
<u>C. irregularis</u> Cockerell	AZ, CA, CO, ID, NM, NV, TX
<u>C. nakaharai</u> Gimpel	FL
<u>C. rubens</u> Maskell	FL
<u>C. sinensis</u> Del Guercio	CA (Santa Clara Co., San Mateo Co., Alameda Co.), NC (Carteret Co.), VA (Southampton Co.)
<u>C. utilis</u> Cockerell	FL (Big Pine Key, Key West)

*Except Hawaii

CEROPLASTODES

<u>C. acaciae</u> Cockerell	AZ, CA, TX
<u>C. daleae</u> Cockerell	NM
<u>C. deani</u> Lawson	KS

COCCUS

<u>C. acutissimus</u> (Green)	FL
<u>C. elongatus</u> (Signoret)	AL, CA, DC, DE, FL, GA, IL, LA, MA, MD, MO, NY, OH, PA, TX
<u>C. hesperidum</u> Linnaeus	Widespread
<u>C. mangiferae</u> (Green)	FL, TX
<u>C. pseudoheperidum</u> (Cockerell)	CA, DC, FL, IN, MA, MD, MO, NC, NH, NJ, NY, PA
<u>C. pseudomagnoliarum</u> (Kuwana)	AZ, CA
<u>C. viridis</u> (Green)	FL, (DC, NY)
<u>C. capparidis</u> (Green)	FL

ERIOPELTIS

<u>E. coloradensis</u> Cockerell	CO, ND
<u>E. festucae</u> (Fonscolombe)	MA, ME, NB, NC, NH, NY, PA, VA

EUCALYMNATUS

<u>E. tessellatus</u> (Signoret)	AR, CA, DC, FL, IN, IL, KS, LA, MA, MD, MO, MS, NJ, NY, OH, PA, SC, TN, TX
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EXAERETOPUS

<u>E. caricis</u> Ehrhorn	CA (Mt. Shasta)
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FILIPPIA (LICHTENSIA)

F. lycii (Cockerell) AZ, CA, NM
(Steinweden (1929) considers this
to belong to the Ctenochiton.)

INGLISIA

I. malvacearum Cockerell AZ
(Congeneric with F. lutea (Cockerell).)
Not an Inglisia.)

I. vitrea (Cockerell) FL
(Not an Inglisia. Genus?)

KILIFIA

K. acuminata (Signoret) DC, FL, MO, NY, TX

K. new species TX

LECANIUM+

L. caryae Fitch CT, IN, KS, MA, ME, MI, MS, NY, NJ,
OH, PA, VA

L. cerasorum Cockerell CA, DE, MD, PA, VA, WA

L. corni Bouché* Widespread

L. excrescens Ferris CA, CT, OR

L. fletcheri Cockerell* AL, AR, CO, CT, DC, IA, ID, IL, IN,
KS, KY, LA, MA, MD, MI, MN, MO, NJ,
NY, OH, OK, OR, PA, RI, SC, TX, VA,
WA, WI, WV

L. kunoensis Kuwana CA

L. nigrofasciatum Pergande AL, AR, CT, DC, DE, FL, GA, IL, IN,
(Not a Lecanium. Probably KY, LA, MA, MD, MI, MO, MS, NC, NJ,
belongs in the Mesolecanium.) NY, OH, OK, PA, SC, TN, TX, VA, WV

+The name Lecanium must be replaced by another name.

*These three species (see next page) with L. cerasifex as defined by
Richards (1958) cannot be satisfactorily separated morphologically and
have been treated by Williams and Kosztarab (1972) as L. corni complex.

<u>L. persicae</u> (Fabricius)	AL, CA, DC, GA, IN, MA, MD, MO, NC, NJ, NY, OH, OR, PA, RI, SC, VA
<u>L. quercifex</u> Fitch*	AL, AR, AZ, CA, CO, CT, DC, FL, GA, ID, IL, IN, MA, MD, ME, MI, MN, MS, NC, NJ, NM, NY, OH, OK, PA, RI, SC, SD TX, UT, VA, VT, WI
<u>L. pruinorum</u> Coquillett	CA, ID, NM, NV, TX, UT

LECANOPSIS

<u>L. lineolatae</u> King and Cockerell	MA The only record is that of the original collection. The specimens have not been seen.
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MESOLECANIUM

<u>M. phoradendri</u> (Cockerell)	AZ
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NEOLECANIUM

<u>N. cornuparvum</u> (Thro)	AL, CT, FL, GA, IN, KY, LA, MD, MS NC, NY, OH, PA, SC, VA, WV
<u>N. imbricatum</u> (Cockerell) (Belongs in the <u>Toumeyella</u> .)	AZ, NM

PARASAISETIA

<u>P. nigra</u> (Nietner)	AL, CA, DC, FL, KS, LA, MD, MO, NY, OH, OK, PA, TX, VA
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PHILEPHEDRA

<u>P. ephedrae</u> (Cockerell)	CA, NM, TX
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PHYSOKERMES

<u>P. coloradensis</u> Cockerell	CO, ID
<u>P. concolor</u> Coleman	CA, OR

<u>P. hemicryphus</u> Dalman*	DC, MD, NY, VA
<u>P. insignicola</u> (Craw)	CA
<u>P. piceae</u> (Schrank)*	CA, IA, ID, IN, MA, ME, MD, MN, MO, NH, NY, PA, WI
<u>P. taxifoliae</u> Coleman	CA, OR

PROTOPULVINARIA

<u>P. pyriformis</u> (Cockerell)	AL, CA, DC, FL, GA, LA, MS, NM, NY, SC, TX
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PSEUDOKERMES

<u>P. cooleyi</u> King	MT Described from <u>Picea</u> but there does not seem to be any other record. MacGillivray placed it in the <u>Pulvinaria</u> . Species not seen.
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PSEUDOPHILIPPIA

<u>P. quaintancii</u> Cockerell	AL, FL, GA, LA, MD, MS, NC, NJ, PA, SC, TN, VA
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PULVINARIA

<u>P. acericola</u> (Walsh and Riley)	AL, AR, CT, DC, GA, IN, LA, MD, MI, MS, NC, NY, OK, PA, SC, TN, TX, VA, WV
<u>P. amygdali</u> Cockerell	NM
<u>P. bigeloviae</u> Cockerell	CA, CO, ID, NM, UT
<u>P. elongata</u> Newstead (Misidentified as <u>P. iceryi</u> (Guerin).)	FL, GA, LA

*The only Physokermes species recorded on spruce in the Eastern U.S. was P. piceae (Schrank) until Williams and Kosztarab (1972) recorded P. hemicryphus Dalman in Virginia. The records of P. hemicryphus in the other states are based on reexaminations of second stage females and young, adult females identified previously as P. piceae and examination of recently collected specimens. The descriptions and differentiating characters for these two species were published by Schmutterer (1956).

<u>P. citricola</u> Kuwana	CA, DC, MD, VA
<u>P. ericicola</u> McConnell	DC, FL, MD, NH, NY, VA
<u>P. floccifera</u> (Westwood)	CA, CT, DC, FL, GA, IL, IN, MA, MD, MO, NC, NJ, NY, OR, RI, SC, TX, VA, WA
<u>P. hydrangeae</u> Steinweden	CA, MA, NY, VA
<u>P. innumerabilis</u> (Rathvon) (Misidentified as <u>P. vitis</u> (L.).)	Widespread
<u>P. mesembryanthemi</u> (Vallot)	CA (Napa Co.)
<u>P. occidentalis</u> Cockerell (considered a synonym of <u>P. vitis</u> (L.).)	
<u>P. peninsularis</u> Ferris (considered a synonym of <u>P. urbicola</u> Cockerell.)	
<u>P. phaiae</u> Lull	CA, MA, NY
<u>P. pruni</u> Hunter	KS, TX
<u>P. psidii</u> Maskell	DC, FL, GA, MO, NY
<u>P. rhois</u> Ehrhorn	CA
<u>P. urbicola</u> Cockerell	FL, LA, TX
<u>P. vitis</u> (Linnaeus)	CA, CO, ID, MT, NY, OR, WA
<u>P. new species</u>	CA (Alameda Co.)

SAISSETIA

<u>S. coffeae</u> (Walker)	AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, MI, MN, MO, MS, MT, NB, NC, NH, NJ, NY, OH, OR, PA, SC, TN, TX, UT, VA, WA, WI
<u>S. miranda</u> (Cockerell and Parrott) (Misidentified as <u>S. oleae</u> (Barnard).)	AZ, CA, DC, FL, LA, MD, MO, NM, NY, OH, OK, PA, VA

S. neglecta De Lotto
(Misidentified as S. oleae
(Bernard).)

FL, LA

S. oleae (Olivier)

AZ, CA, CO, CT, DC, FL, KS, LA, MA,
NJ, NM, NY, SC, WA

SPHAEROLECANIUM

S. prunastri (Fonscolombe)

NJ, NY, PA

TOUMEYELLA

T. cerifera Ferris

FL, LA, NC, VA

T. liriodendri (Gmelin)

CT, NY south to FL, west into the
Mississippi River Valley, CA

T. mirabilis (Cockerell)

NM, TX

T. numismaticum Pettit and McDaniel
(Synonym of T. parvicornis
(Cockerell).)

T. parvicornis (Cockerell)

IA, MN, NB, ND, SD and east of the
Mississippi River

T. pini (King)

CT, FL, GA, MD, MI, NY, PA, VA

T. pinicola Ferris

CA

T. quadrifasciata (Cockerell)

NM

T. turgida (Cockerell) (Probably
a synonym of T. liriodendri
(Gmelin).)

FL

T. virginiana Williams and
Kosztarab

FL, GA, MD, VA

EUROPEAN SPECIES OF CARULASPIS MacGillivray
(HOMOPTERA: DIASPIDIDAE)
S. Nakahara, Entomologist

Carulaspis juniperi (Bouche), the "juniper scale", is a pest of junipers in North America. This and two other species are often intercepted from Europe on juniper and mistletoe.

The purpose of this paper is to aid the identifiers to recognize the species that occur in Europe and the Mediterranean area.

Borchsenius' catalogue lists C. taxicola (Vayssiere) from Algeria on Taxus. Because the available information concerning this species is inadequate, it is not included in the key.

The scale covers of the adult females of this genus are white, circular to oval and convex. The exuviae are central or subcentral and yellow.

Key to the Species

1. Submarginal dorsal macroducts present on the sixth abdominal segment 2
Submarginal dorsal macroducts absent from the sixth abdominal segment 3
- 2(1). Gland spines present between the median lobes; median lobes well developed and separated from each other by distance approximately equal to the width of a lobe. On mistletoe. visci (Schrank)
Gland spines absent between the median lobes; median lobes reduced and separated from each other by distance greater than width of a lobe. On juniper and cypress atlantica (Lindinger)
- 3(1). Marginal macroduct present between the median lobes 4
Marginal macroduct absent between the median lobes minima (Targioni-Tozzetti)
- 4(3). Gland spines present between the median lobes; abdominal segments 2 and 3 each with less than ten submedial macroducts; segment 6 with two marginal macroducts juniperi (Bouché)
Gland spines absent between the median lobes; abdominal segments 2 and 3 each with more than ten submedial macroducts; segment 6 with one marginal macroduct . . . silvestrii Lupo

Carulaspis atlantica (Lindinger)

Hosts: Callitris sp., Cupressus sp., Juniperus sp.

Distribution: Canary Islands, Morocco

Carulaspis juniperi (Bouché)

Commonly used synonyms: Diaspis carueli (Targioni-Tozzetti), D. visci Schrank, Carulaspis visci (Schrank)

Common name: Juniper scale

Hosts: Chamaecyparis sp., Cupressus sp., Cupressocyparis sp.,
Juniperus sp., Libocedrus sp., Sequoia sp., Thuja sp.

Distribution: Algeria, Canada, Canary Islands, Chile, Europe,
United States.

Intercepted from Europe.

Carulaspis minima (Targioni-Tozzetti)

Common name: Minute cypress scale

Hosts: Callitris sp., Chamaecyparis sp., Cupressus sp.,
Juniperus sp., Thuja sp.

Distribution: Algeria, Argentina, Azores, Bermuda, Chile, Cuba,
Erithrea, England, France, Greece, Italy, Morocco,
Palestine, Portugal, Russia (Caucasia, Ukraine), Spain,
Sweden, Uruguay, United States (Florida, California,
Hawaii, Kansas, Louisiana, North Carolina, New Mexico,
Oklahoma, Texas, Utah, Virginia, Washington)

Intercepted from Azores, Bermuda, France, England, Greece, Israel,
Italy, Spain, Sweden.

Carulaspis silvestrii Lupo

Host: Juniperus sp.

Distribution: Italy

Carulaspis visci (Schränk)

Host: Viscum album

Distribution: Azores, Austria, Czechoslovakia, Germany, Greece,
Hungary, Italy

Intercepted from Azores, Greece, Italy

REFERENCES

1. Balachowsky, A. S.
1954 Les Cochenilles Palearctiques de la tribu des Diaspidini. Memoires Scientifiques de l'Institut Pasteur, Paris.
2. Boratynski, K.
1957 On the two species of the genus Carulaspis MacGillivray, Ent. Mon. Mag. 93:246-251.
3. Borchsenius, N. S.
1966 A catalogue of the armored scale insects of the world, pp. 160-161, "Nauka", Moscow.
4. Lupo, V.
1966 Genere Carulaspis MacGillivray. E le specie paleartiche and esso appartenenti. Atti della Accademia Nazionale Italiana Entomologica 13:34-48.
5. McKenzie, H.L.
1956 The armored scale insects of California. Bull. Calif. Ins. Sur. 5:91-94.
6. Vayssiere, P.
1913 Note sur les Coccides de l'Afrique Occidentale. An des Epiphyties, Paris.

SELECTED COCCOIDEA REFERENCES

BIBLIOGRAPHICAL

- Morrison, H. and Renk, A.V.
1957. A selected bibliography of the Coccoidea, USDA Misc. Pub. 734, 222p.
- Morrison, H. and Morrison, E. R.
1965. A selected bibliography of the Coccoidea, First supplement. USDA Misc. Pub. 987, 44p.

COCCOIDEA

- Beardsley, J. W.
1966. Coccoidea. Insects of Micronesia 6(7): 377-562.
- Ferris, G. F.
1935-1955. Atlas of the Scale Insects of North America, Series I-IV, Vols V-VII. Stanford Univ. Press., Stanford.
- Green, E. E.
1896-1922. The Coccidae of Ceylon, parts 1-5. Dulau Co., London.
- Mamet, R.
Notes of the Coccoidea of Madagascar. Parts I-IV.
Part I: 1950. Mem. Inst. Sci. Madagascar, Ser. A. 4:17-38.
Part II: 1951. Ibid. 5:213-54.
Part III: 1954. Mem. Inst. Sci. Madagascar, Ser. E (Entomology). 4:1-86.
Part IV: 1959. Ibid. 11:369-479.
- Morrison, H. and Morrison, E. R.
1966. An annotated list of the generic names of the scale insects (Homoptera: Coccoidea). USDA Misc. Pub. 1015, 206p.
- Takahashi, R.
1929-1930. Observations of the Coccidae of Formosa. Parts 1-2. Formosa Govt. Res. Inst. Dept. Agr. Rpt. 40, 48.
- 1933-1935. Observations of the Coccidae of Formosa. Parts 3-5. In Formosa Govt. Res. Inst. Dept. Agr. Rpt. 60, 63, 66.

COCCOIDEA (Continued)

- Takahashi, R.
1942. Some injurious insects of agricultural plants and forest trees in Thailand and Indo-China, II Coccidae. Formosa Govt. Agr. Res. Inst. Rpt. 81, 56p.
- Williams, D. J.
1969. The family-group names of the scale insects (Homoptera: Coccoidea). Bull. Brit. Mus. (Nat. Hist.) Entomol. 23(8): 317-341.
- Zimmerman, E. C.
1948. Insects of Hawaii. Vol. 5. Homoptera-Sternorrhyncha. University of Hawaii Press, 464p. (132-436).

ACLERDIDAE

- McConnell, H. S.
1953. The coccid family Aclerididae. Univ. MD Agr. Expt. Sta. Bull. A-75, 121p.

ASTEROLECANIIDAE

- Ferris, G. F.
1955. Atlas, vol. VII.
- Kosztarab, M. and Vest, D.F.
1966. Two new Cerococcus species, with a revised key to the genus in North America (Homoptera: Coccoidea: Asterolecaniidae). Ann. Entomol. Soc. Am. 59: 369-376.
- McKenzie, H. L.
1958. A new asterolecaniid scale on succulents from Mexico (Homoptera: Coccoidea: Asterolecaniidae). Pan Pacific Entomol. 34(3): 169-172.
- Takahashi, R.
1956. A new scale insect of Asterolecanium from Japan (Asterolecaniidae, Coccoidea, Homoptera). Akitu 5: 4-6.
- Russell, L. M.
1941. A classification of the scale insect genus Asterolecanium. USDA Misc. Pub. 424, 322 p.

COCCIDAE

- Beardsley, J. W.
1966 Coccoidae. Insects of Micronesia.
- Ben-Dov, Y.
1970. The wax scales of the genus Ceroplastes Gray (Homoptera: Coccidae) and their parasites in Israel. Israel J. Entomol. 5:83-92.
1971. An annotated list of the soft scale insects (Homoptera: Coccidae) of Israel. Israel J. Entomol. 6:23-34.
- De Lotto, G.
1959. Further notes on Ethiopian species of the genus Coccus (Homoptera: Coccoidea: Coccidae). J. Entomol. Soc. South Afr. 22(1): 149-173.
1965. On some Coccidae (Homoptera), chiefly from Africa, Bull. Br. Mus. (Nat. Hist.) Entomol. 16(4): 177-239.
1966. Descriptions of three new species of Coccus (Homoptera: Coccoidea) from South Africa. Proc. R. Entomol. Soc. Lond. (B). 35(3-4): 41-46.
1967. The soft scales (Homoptera: Coccoidea) of South Africa 1. South Africa J. Agr. Sci. 10:781-810.
- Dekle, G. W.
1963. A field key to wax scales in Florida. FL Dept. Agr. Div. Entomol. Cir. 144, 1p.
1974. Key to greenhouse soft scale insects (Coccidae: Homoptera). FL Dept. Agr. Cons. Serv. Div. Plant Ind. Entomol. Cir. 144, 1p.
- Ezzat, Y. M. and Hussein, N. A.
1967. Redescription and classification of the family Coccidae in U.A.R. (Homoptera: Coccoidea). Bull. Soc. Entomol. Egypte 51:359-426.
- Giliomee, J. H.
1967. Morphology and taxonomy of adult males of the family Coccidae (Homoptera: Coccoidea). Bull. Br. Mus. (Nat. Hist.) Entomol. supp. 7, 168 p.

- Gimpel, F. W., Miller, D. R. and Davidson, J. A.
1974. A systematic revision of the wax scales genus Ceroplastes,
in the United States (Homoptera, Coccoidea, Coccidae).
U. MD Agr. Expt. Sta. Misc. Pub. 841, 85 p.
- Green, E. E.
1904. Coccidae of Ceylon. Part III.
- Hodgson, C. J.
1968. Further notes on the genus Pulvinaria Targ (Homoptera:
Coccoidea) from the Ethiopian region. J. Entomol.
Soc. South Afr. 31(1):141-174.
- Morrison, H.
1920. The nondiaspine Coccidae of the Philippine Islands, with
descriptions of apparently new species. Philipp.
J.Sci. 17(2):1-47.
1921. Some nondiaspine Coccidae from the Malay Peninsular,
with descriptions of apparently new species.
Philipp. J. Sci. 18(6):637-677.
- Takahashi, R.
1955. Key to the genera of Coccidae in Japan, with descriptions
of two new genera and a little known species. In-
secta Matsumurana 19(1-2):23-28.
1955. Lecanium of Japan (Homoptera: Coccidae). Trans. Shikoku
Entomol. Soc. 4(5-6):69-78.
1955. Pulvinaria of Japan (Coccidae, Homoptera). Kontyu 23:
148-154.
1955. Protopulvinaria and Luzulaspis of Japan (Coccidae, Hom-
optera). Annot. Zool. Japonenses 28(1):35-39.
1956. Pulvinaria of Japan (Coccidae, Homoptera). Kontyu 24:
23-30.
- Richards, W. R.
1958. Identities of species of Lecanium Burmeister in Canada
(Homoptera: Coccoidea) Canad. Entomol. 90(5):
305-313.

COCCIDAE (Continued)

- Steinweden, J. B.
1930. Characteristics of some of our California soft scale insects, (Coccidae). Calif. Dept. Agr. Monthly Bull. 19(8):561-571.
1946. The identity of certain common American species of Pulvinaria (Homoptera: Coccoidea: Coccidae). Microentomology 11:2-28.
- Williams, M. L. and Kosztarab, M.
1972. The insects of Virginia: No. 5. Morphology and systematics of the Coccidae of Virginia with notes on their biology (Homoptera: Coccoidea). VA Polytech. Inst. State Univ. Res. Div. Bull. 52, 215 p.
- Zimmerman, E. C.
1948. Insects of Hawaii, Vol. V.

DACTYLOPIIDAE

- De Lotto, G.
1974. On the status and identity of the cochineal insects (Homoptera: Coccoidea: Dactylopiidae). J. Entomol. Soc. South Afr. 37(1):167-193.
- Ferris, G. F.
1955. Atlas Vol. VII.

CONCHASPIDIDAE

- Mamet, R.
1954. A monograph of the Conchaspidae Green (Hemiptera: Coccoidea). Trans. R. Entomol. Soc. London 105(11): 189-239.

DIASPIDIDAE

- Balachowsky, A. S.
1948-1953. Les Cochenilles de France, d'Europe, du Nord de l'Afrique, et du Bassin Mediterranéen. Parts IV through VII. (Aspidiotini, Odonaspidini, Parlatorini). Actual. Sci. et Indus. Ent. Appl.
1954. Les Cochenilles Palearctiques de la Tribu des Diaspidini. Mem. Sci. de l'Institut Pasteur. Paris, 450 p.

DIASPIDIDAE (Continued)

- Balachowsky, A. S.
1956. Les Cochenilles Du Continent Africain Noir, V. 1-Aspidiotini. Mus. Roy. du Congo Belge (Tervuren) Ann. Sci. Zool. 3:1-142.
1958. Les Cochenilles Du Continent Africain Noir, V. 2-Aspidiotini, Odonaspidini and Parlatorini. Mus. Roy. du Congo Belge (Tervuren) Ann. Sci. Zool. 4:149-356.
1959. Nuevas Cochinillas de Colombia. Rev. Acad. Colombiana Cien. Exactas, Fisicas Naturales 10(41):337-366.
- Beardsley, J. W.
1970. Aspidiotus destructor Signoret, an armored scale pest new to the Hawaiian Islands. Proc. Hawaii Entomol. Soc. 20(3):505-508.
- Borchsenius, N. S.
1964. Notes on the coccid fauna (Homoptera, Coccoidea) of India. I. New genus and three new species of armored scales of tribe Leucaspini (Diaspididae). Entomol. Obozr. 43(4):864-871.
1966. A Catalogue of the Armoured Scale Insects (Diaspidoidea) of the world. Zool. Inst. Acad. Sci. USSR, Moscow, Leningrad, 449 p.
1967. On the fauna of armored scale insects (Homoptera, Coccoidea) of India. Communication 2. Andaspis MacG. and three new allied genera (Diaspididae). Entomol. Obozr. 46(3):724-734.
- Borchsenius, N. S. and Williams, D. J.
1963. Scale-insects of the genus Contigaspis MacGillivray (Homoptera, Coccoidea) of the world fauna. Entomol. Obozr. 42(3):594-610.
- Brimblecombe, A. R.
1953. Studies of the Coccoidea. 1. New species of Neoleonardia. Queensland J. Agr. Sci. 10(3):161-166.
1955. Studies of the Coccoidea. 3. The genera Chentraspis, Clavaspis, Lindingaspis, and Morganelia in Queensland. Queensland J. Agr. Sci. 12(2):39-56.
1962. Studies of the Coccoidea. 2. Species occurring on deciduous fruit and nut trees in Queensland. Queensland J. Agr. Sci. 19(2):219-229.

DIASPIDIDAE (Continued)

- Brimblecombe, A. R.
1968. Studies of the Coccoidea. 14. The genera Aspidiotus, Diaspidiotus and Hemiberlesia in Queensland. Queensland J. Agr. and Animal Sci. 25:39-56.
- Brookes, H. M. and Hudson, N. M.
1968. The identification and distribution of Quadraspidiotus species (Homoptera: Diaspididae) on pome and stone fruits in Australia. J. Aust. Entomol. Soc. 7:90-100.
- Davidson, J. A.
1964. The genus Abgrallaspis in North America (Homoptera: Diaspididae). Ann. Entomol. Soc. Am. 57:638-643.
- Dekle, G. W.
1965. Florida Armored Scale Insects. Arthropods of Florida and neighboring land areas, Vol. 3. Div. of Plant Indus., FL Dept. Agr.
- Ezzat, Y. M.
1958. Classification of the scale insects, family Diaspididae, as known to occur in Egypt. Bull. Soc. Entomol. Egypte 52:233-251.
- Ezzat, Y. M. and Afifi, S. A.
1965. Redescription and classification of the scale insects of the family Diaspididae originally described by W. J. Hall from Egypt. Bull. Soc. Entomol. Egypte 44:1-43.
- Ferris, G. F.
1941. The genus Aspidiotus (Homoptera: Coccoidea: Diaspididae). Microentomology 6(2):33-70.
1943. Additions to the knowledge of the Diaspididae (Homoptera: Coccoidea). Microentomology 8(2):24-32.
1946. Information concerning the genera Chortinaspis and Aspidiotus (Homoptera: Coccoidea: Diaspididae). Microentomology 11(1):37-49.
1947. The genus Pinnaspis Cockerell (Homoptera: Coccoidea: Diaspididae). Microentomology 12(2):25-58.
1955. The genus Phenacaspis Cooley and Cockerell (Insecta: Homoptera: Coccoidea). Pt. 1. Microentomology 20(3):41-82.

DIASPIDIDAE (Continued)

- Ferris, G. F.
1956. The genus Phenacaspis Cooley and Cockerell (Insecta: Homoptera: Coccoidea). Pt. 2. Microentomology 21(2):67-83.
- Ghauri, M. S. K.
1962. The Morphology and Taxonomy of Male Scale Insects (Homoptera: Coccoidea). Br. Mus. (Nat. Hist.), London, 221 p.
- Hall, W. J.
1936. On the Ethiopian Diaspidini (Coccoidea). Trans. R. Entomol. Soc. Lond. 97(20):497-583.
- Hall, W. J. and Williams, D. J.
1962. New Diaspididae (Homoptera: Coccoidea) from the Indo-Malayan Region. Bull. Br. Mus. (Nat. Hist.) 13(2): 22-43.
- Howell, J. O.
1974. A new species of Haliaspis from Florida on Spartina spartinae (Homoptera: Coccoidea: Diaspididae). Ann. Entomol. Soc. Am. 67(1):40-42.
- Komosinska, H.
1969. Studies on the genus Abgrallaspis Balachowsky, 1948 (Homoptera: Coccoidea: Diaspididae). Acta Zool. Cracoviensia, 14(3):43-85.
- Kosztarab, M.
1963. The armored scale insects of Ohio (Homoptera: Coccoidea: Diaspididae). Bull. Ohio B col. Surv. 2(2):1-120.
- Kuwana, I.
The diaspine Coccidae of Japan. Dept. Finance, Imperial Plant Quar. Serv.
1925. Pt. 1. Genera Poliaspis, Ischnaspis, and Parlatoria. Tech. Bul. 1.
Pt. 2. The genus Lepidosaphes. Tech. Bull. 2.
Pt. 3. The genus Fiorinia. Tech. Bull. 3.

DIASPIDIDAE (Continued)

- Kuwana, I.
1926. Pt. 4. Genera Cryptoparlatoria, Howardia, Sasakiaspis (n. gen.), Diaspis, Aulacaspis, Pinnaspis, and Prontaspis. Tech. Bull. 4.

The diaspine Coccidae of Japan. Min. Agr. and Forestry, Dept. Agr.
1928. Pt. V. General Chionaspis, Tsukushiaspis (n. gen.), Leucaspis, Nikkoaspis (n. gen.). Sci. Bull. 1.
1931. Pt. VI. Genus Phenacaspis. Sci. Bull. 2.
1933. The diaspine Coccidae of Japan, VII. Min. Agr. and Forestry, Dept. Agr. Sci. Bull. 3.
- Mamet, R.
1950-1959. Notes on the Coccoidea of Madagascar. (See under Coccoidea).
1958. The Selenaspidus complex (Homoptera: Coccoidea). Mus. R. du Congo Belge (Tervuren) Ann. Sci. Zool. 4:(359)-429.
- McKenzie, H. L.
1939. A revision of the genus Chrysomphalus and supplementary notes of the genus Aonidiella. Microentomology 4(2):29-51-77.
1943. Miscellaneous diaspid studies including notes on Chrysomphalus. Calif. Dept. Agr. Bull. 32(2):148-162.
1944. Miscellaneous diaspid scale studies. Calif. Dept. Agr. Bull. 33:53-59.
1945. A Revision of Parlatoria and closely allied genera. Microentomology 10(2):47-121.
1950. The genera Lindingaspis MacGillivray and Marginaspis Hall. Microentomology 15(3):98-124.
1952. New Parlatorine scales from India and Egypt, and supplementary notes on other related species. Calif. Dept. Agr. Bull. 41(1):9-18.

DIASPIDIDAE (Continued)

- McKenzie, H. L.
1953. A new scale insect from the Ryukyu Islands related to red scale. Calif. Dept. Agr. Bull. 42(1):1-4.
1953. The genus Aonidiella (Homoptera: Coccoidea: Diaspididae). Microentomology 3(1):1-36.
1956. The armored scale insects of California. Calif. Insect Survey Bull. 5, Univ. of Calif. Press.
- Munting, J.
1965. A revision of the Ethiopian species of Africaspis MacGillivray 1921 (Homoptera: Diaspididae). Rep. South Africa Agr. Tech. Serv. Entomol. Mem. vol. 11, 32 p.
1967. New and little known armoured scales (Homoptera: Diaspididae) from South Africa-2. J. Entomol. Soc. South Afr. 28(2):179-216.
1969. Observations on some armoured scale insects (Homoptera: Coccoidea: Diaspididae) from South West Africa and neighboring territories. CIMBEBASIA ser. A, 1(6):115-161.
- Rao, V. P.
1949. The genus Unaspis MacGillivray. Microentomology 14(2): 59-72.
- Scott, C. L.
1952. The scale insect genus Aulacaspis in Eastern Asia (Homoptera: Coccoidea: Diaspididae). Microentomology 17(2):33-60.
- Takagi, S.
1956. Notes on the Japanese species of the genus Pseudaulacaspis MacGillivray, with description of a new species. Insecta Matsumurana 19(3-4):113-116.
1957. A revision of the Japanese species of the genus Aspidiotus, with description of a new genus and a new species. Insecta Matsumurana 21(1-2):31-40.
1958. New or little known scale insects of the tribe Aspidiotini, with a list of the genera and species of the tribe occurring in Japan (Homoptera: Coccoidea). Insecta Matsumurana 21(3-4):121-131.

DIASPIDIDAE (Continued)

- Takagi, S.
1959. Notes on the scale insects of the "Tribe" Odonaspidini occurring in Japan (Homoptera: Coccoidea). *Insecta Matsumurana* 22(3-4):92-95.
1960. A contribution to the knowledge of the Diaspidini of Japan (Homoptera: Coccoidea). Pt. I. *Insecta Matsumurana* 23(2):67-100.
1961. A contribution to the knowledge of the Diaspidini of Japan (Homoptera: Coccoidea). Pt. II. *Insecta Matsumurana* 24(1):4-42.
1961. A contribution to the knowledge of the Diaspidini of Japan (Homoptera: Coccoidea). Pt. III. *Insecta Matsumurana* 24(2):69-103.
1963. Notes on the Aspidistreae-complex of Pinnaspis, with description of a new species. *Insecta Matsumurana* 28(1):64-68.
1966. Some Diaspididae of Japan. *Insecta Matsumurana* 28(2):93-120.
1969. Diaspididae of Taiwan based on material collected in connection with the Japan-U.S. Co-operative Sci. Programme, 1965. Pt. I. *Insecta Matsumurana* 32(1):1-110.
1970. Diaspididae of Taiwan based on material collected in connection with the Japan-U.S. Co-operative Science Programme, 1965. Part II. *Insecta Matsumurana* 33(1):1-146.
- Takagi, S. and Yamamoto, M.
1974. Two new banana infesting scale insects of Hemiberlesia or Abgrallaspis from Ecuador (Homoptera: Coccoidea). *Insecta Matsumurana* new series 3:35-42.
- Williams, D. J.
1957. The genus Semelaspidus MacGillivray (Aspidiotini: Coccoidea: Hemiptera). *Proc. R. Entomol. Soc. Lond. (B)* 26(3-6):7-11.
1963. Synoptic revision of I. Lindingaspis and II. Andaspis with two new allied genera (Hemiptera: Coccoidea). *Bull. Br. Mus. (Nat. Hist.) Entomol.* 15(1):1-31.

DIASPIDIDAE (Continued)

- Williams, D. J.
1969. A new species of Parlagena McKenzie attacking coconut trees in Trinidad (Homoptera, Coccoidea, Diaspididae). Bull. Entomol. Res. 59(1):97-99.
1971. Synoptic discussion of Lepidosaphes Shimer and its allies with a key to genera (Homoptera, Coccoidea, Diaspididae). Bull. Entomol. Res. 61:7-11.
1971. On the taxonomy of two Diaspididae (Homoptera: Coccoidea) from Hong Kong. Bull. Entomol. Res. 60:447-452.
1971. A new species of Abgrallaspis Balachowsky (Homoptera, Coccoidea, Diaspididae) from a nursery in England causing leaf-spotting on orchids. Bull. Entomol. Res. 60:453-455.

ERIOCOCCIDAE

- Ferris, G. F.
1955. Atlas. vol. VII
- Hoy, J. M.
1962. Eriococcidae (Homoptera: Coccoidea) of New Zealand. New Zealand Dept. Sci. and Indus. Res. Bull. 146.
1963. A catalogue of the Eriococcidae (Homoptera: Coccoidea) of the world. New Zealand Dept. Sci. and Indus. Res. Bull. 150.
- Miller, D. R. and McKenzie, H. L.
1967. A systematic study of Ovaticoccus Kloet and its relatives, with a key to North American genera of Eriococcidae. Hilgardia 38(13):471-538.
- Takahashi, R.
1957. Key to some species of Eriococcus in Japan. Akitu 6:6-7.

HALIMOCOCCIDAE

- Beardsley, J. W.
1963. Notes on Hawaiian Phoenicococcinae, with description of a new species (Homoptera: Diaspididae). Pacific Insects 5(1):59-64.
- Ferris, G. F.
1952. Some miscellaneous Coccoidea (Insecta: Homoptera). Microentomology 17(1):1-32.
1942. Atlas. Series 4.
- Stickney, F. S.
1934. The external anatomy of the red date scale Phoenicococcus marlatti Cockerell, and its allies. USDA Tech. Bull. 404, 163 p.
- Zimmerman, E. C.
1948. See Insects of Hawaii Vol. V.

LECANODIASPIDIDAE

- Hodgson, C. J.
1973. A revision of the Lecanodiaspis Targioni-Tozzetti (Homoptera: Coccoidea) of the Ethiopian Region. Bull. Br. Mus. (Nat. Hist.) Entomol. 27(8):413-452.
- Howell, J. O. and Kosztarab, M.
1972. Morphology and systematics of the adult females of the genus Lecanodiaspis (Homoptera: Coccoidea: Lecanodiaspididae). VA Polytech. Inst. State Univ. Res. Div. Bull. 70, 248 p.
- Lambdin, P. L. and Kosztarab, M.
1973. A revision of the seven genera related to Lecanodiaspis (Homoptera: Coccoidea: Lecanodiaspididae). VA Polytech. Inst. State Univ. Res. Div. Bull. 83, 110 p.

MARGARODIDAE

- Jakubski, A. W.
1965. A critical revision of the families Margarodidae and Termitococcidae. Br. Mus. (Nat. Hist.), London, 187 p.

MARGARODIDAE (Continued)

- Boratynski, K. L.
1952. Matsucoccus pini (Green, 1925). Bionomics and external anatomy with reference to the variability of some taxonomic characters. Trans. R. Entomol. Soc. Lond. 103:285-326.
- Morrison, H.
1928. A classification of the higher groups and genera of the coccid family Margarodidae. USDA Tech. Bull. 52, 240 p.
- Rao, V. P.
1951. Iceryine scale insects recorded from the Orient. Indian J. Entomol. 12(1):39-66, 12(2):127-158.

ORTHEZIIDAE

- Morrison, H.
1925. Classification of scale insects of the subfamily Ortheziinae. J. Agr. Res. 30(2): 97-154.
1952. Classification of the Ortheziidae. Supplement to "Classification of scale insects of the subfamily Ortheziinae". USDA Tech. Bull. 1052, 80 p.

PHOENIOCOCOCCIDAE

- Stickney, F. S.
1934. The external anatomy of the red date scale Phoenicococcus marlatti Cockerell, and its allies. USDA Tech. Bull. 404, 163 p.

PSEUDOCOCCIDAE

- Afifi, S. A.
1968. Morphology and taxonomy of the adult males of the families Pseudococcidae and Eriococcidae (Homoptera: Coccoidea). Bull. Br. Mus. (Nat. Hist.) Entomol. supp. 13, 210 p.

PSEUDOCOCCIDAE (Continued)

Beardsley, J. W.

1960. A preliminary study of the males of some Hawaiian mealybugs (Homoptera: Pseudococcidae). Proc. Hawaii. Entomol. Soc. 17(2):199-243.
1962. Description and notes on male mealybugs (Homoptera: Pseudococcidae). Proc. Hawaii. Entomol. Soc. 18(1):81-98.
1965. Notes on the pineapple mealybug complex, with descriptions of two new species (Homoptera: Pseudococcidae). Proc. Hawaii. Entomol. Soc. 19(1):55-68.
1966. Coccoidea. Insects of Micronesia.
1971. New genera and species of Hawaiian Pseudococcidae (Homoptera). Proc. Hawaii. Entomol. Soc. 21(1):41-58.

Borchsenius, N. B.

1948. Notes on Pseudococcus comstocki (Kuw.) and some allied species (Homoptera: Coccoidea), with descriptions of three new species. Bull. Entomol. Res. 39:417-421.

De Lotto, G.

1957. The Pseudococcidae (Hom.: Coccoidea) described by H. C. James from East Africa. Bull. Br. Mus. (Nat. Hist.) Entomol. 5(5):195-232.
1958. The Pseudococcidae (Homoptera: Coccoidea) described by C. K. Brain from South Africa. Bull. Br. Mus. (Nat. Hist.) Entomol. 7(3):79-120.
1961. New Pseudococcidae (Homoptera: Coccoidea) from Africa. Bull. Br. Mus. (Nat. Hist.) Entomol. 10(6):211-238.
1964. Observations on African mealybugs (Homoptera: Coccoidea). Bull. Br. Mus. (Nat. Hist.) Entomol. 14(8):343-397.
1967. The mealybugs of South Africa (Homoptera: Pseudococcidae) I. Rep. South Africa Dept. Agr. Tech. Serv. Entomol. Mem. 12. 28 p.

Ezzat, Y. M.

1962. A synopsis of the family Pseudococcidae as known in Egypt, U.A.R. Bull. Soc. Entomol. Egypte 46:155-170.

PSEUDOCOCCIDAE (Continued)

- Ezzat, Y. M. and McConnell, H. S.
1956. A classification of the mealybug tribe Planococcini (Pseudococcidae: Homoptera). MD Agr. Expt. Sta. Bull. A-84, 108 p.
- Ferris, G. F.
1950, 1953. Atlas, Vols V-VI.
1955. On some genera of the Pseudococcidae. Microentomology 20(1):1-19.
- Hambleton, E. J.
1946. Studies of Hypogeic mealybugs. Rev. Entomol. 17:1-77.
1973. Florida mealybugs of the genus Rhizoecus with description of a new species. Proc. Entomol. Soc. Wash. 75:62-71.
- McKenzie, H. L.
1964. Fourth Taxonomic study of California mealybugs, with additional species from North America, South America, and Japan. Hilgardia 35:211-272.
1967. The mealybugs of California with taxonomy, biology and control of North American species (Homoptera: Coccoidea: Pseudococcidae). Univ. Calif. Press, Berkeley and Los Angeles, 525 p.
- Miller, D. R. and McKenzie, H. L.
1971. Sixth taxonomic study of North American mealybugs with species from South America. Hilgardia 40:565-602.
1973. Seventh taxonomic study of North American mealybugs. Hilgardia 41:489-542.
- Takahashi, R.
1957. Key to the genera of Pseudococcidae in Japan, with description of three new genera and two new species (Homoptera). Bull. Univ. Osaka Pref. Series B. 7:1-8.

PSEUDOCOCCIDAE (Continued)

- Williams, D. J.
1960. The Pseudococcidae (Coccoidea: Homoptera) of the Solomon Islands. Bull. Br. Mus. (Nat. Hist.) Entomol. 8(10):387-430.
1962. The British Pseudococcidae (Homoptera: Coccoidea). Bull. Br. Mus. (Nat. Hist.) Entomol. 12(1):3-79.
1969. A new species of Cataenococcus Ferris (Homoptera, Coccoidea, Pseudococcidae) on banana in Costa Rica. Bull. Entomol. Res. 59:101-104.
1969. A revision of the genus Geococcus Green (Homoptera, Coccoidea, Pseudococcidae). Bull. Entomol. Res. 59(3):505-517.
1970. The mealybugs (Homoptera, Coccoidea, Pseudococcidae) of sugarcane, rice and sorghum. Bull. Entomol. Res. 60(1):109-188.
1973. The cactus-feeding mealybugs from Argentina (Homoptera, Coccoidea, Pseudococcidae). Bull. Entomol. Res. 62:565-570.
- Williams, D. J. and de Boer, J. A.
1973. The taxonomy of some New Zealand Pseudococcidae (Homoptera: Coccoidea). Trans. R. Entomol. Soc. Lond. 125(2):227-252.
- Yang, S. and Kosztarab, M.
1967. A morphological and taxonomical study on the immature stages of Antonina and of the related genera. VA. Polytech. Inst. Res. Div. Bull. 3, 73 p.
- Zimmerman, E. C.
1948. Insects of Hawaii, Vol. V.

TACHARDIIDAE
(Kerridae, Lacciferidae)

- Chamberlin, J. C.
1923. A systematic monograph of the Tachardiinae or lac insects (Coccidae). Bull. Entomol. Res. 14:147-212.
- Munting, J.
1966. Lac insects (Homoptera: Lacciferidae) from South Africa II. Rev. Zool. Bot. Afr. 74(1-2):121-134.